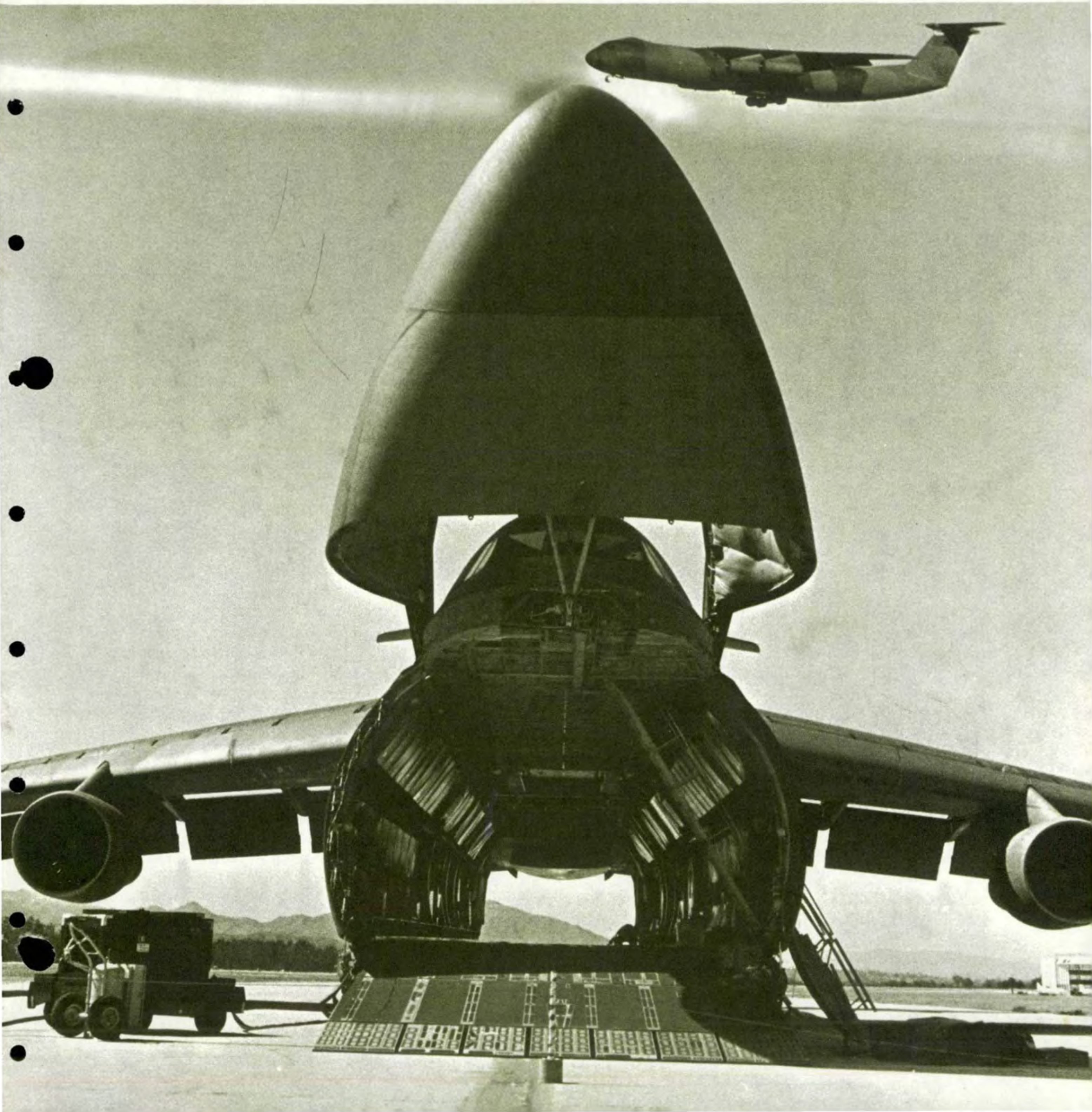
flying SAFETY THE HEAVIES

MAY 1984



THERE I WAS

■ Our C-130 crew was returning from a Friday night air drop training mission to home base. During the high level return trip, the IP was chatting with his students about the birthday party he was having for his soon-to-be five-year-old son the next day. As we had to penetrate a frontal area, I suggested we call metro when we were 45 minutes out. The IP agreed and dialed in the frequency of an enroute Air Force base we were passing.

Our Friday evening arrival weather was anything but encouraging, suddenly below minimums for any approach, with heavy fog. The nearest alternate was 30 minutes away on the other side of the front. Weather at that location was better, but with locally heavy thunderstorms.

I took this occasion to question my navigator student as to what he would do if it were his decision. His correct judgment was that we had enough fuel to continue to our destination but needed to depart the local area with at least 9,000 pounds of fuel to be legal at our alternate. We informed the pilot of our decision that we could hold at destination, but only for 20 minutes.

After two trips in the holding pattern with no improvement in the weather, as the IN, I suggested a diversion. Three holding patterns later and following a heated discussion over the pilot's shoulder, we headed toward our alternate.

Our fuel overhead the alternate now appeared to be over 1,000 pounds below the command-directed minimum of 6,000 pounds. Realizing the gravity of our situation, the pilot showed good judgment by asking for a direct clearance and declaring minimum fuel. Twenty miles out we asked for and received clearance for a visual straight-in from Approach Control. Shortly afterwards, we were shocked to learn from Tower that the airport was closed because of an overhead thunderstorm and was not expected to reopen for another 15 minutes.

At this point, I informed the pilot that the airborne radar was good and that I felt we could get through a hole if we could get a special VFR landing clearance. Down to only one alternative, we accomplished it, landing after an "exciting" final approach with less than 3,800 pounds of fuel and made it to the ramp without a flameout.

"Gethomeitis" is an old, familiar problem to safety and operations types. Here is a case where the sense of responsibility and experience of a good nonpilot crewmember averted what could have been a tragedy. Everyone on a crew shares in the responsibility for safe completion of the mission. There are some good lessons to be "re-learned" here. ■

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SPECIAL FEATURES

REGULAR FEATURES

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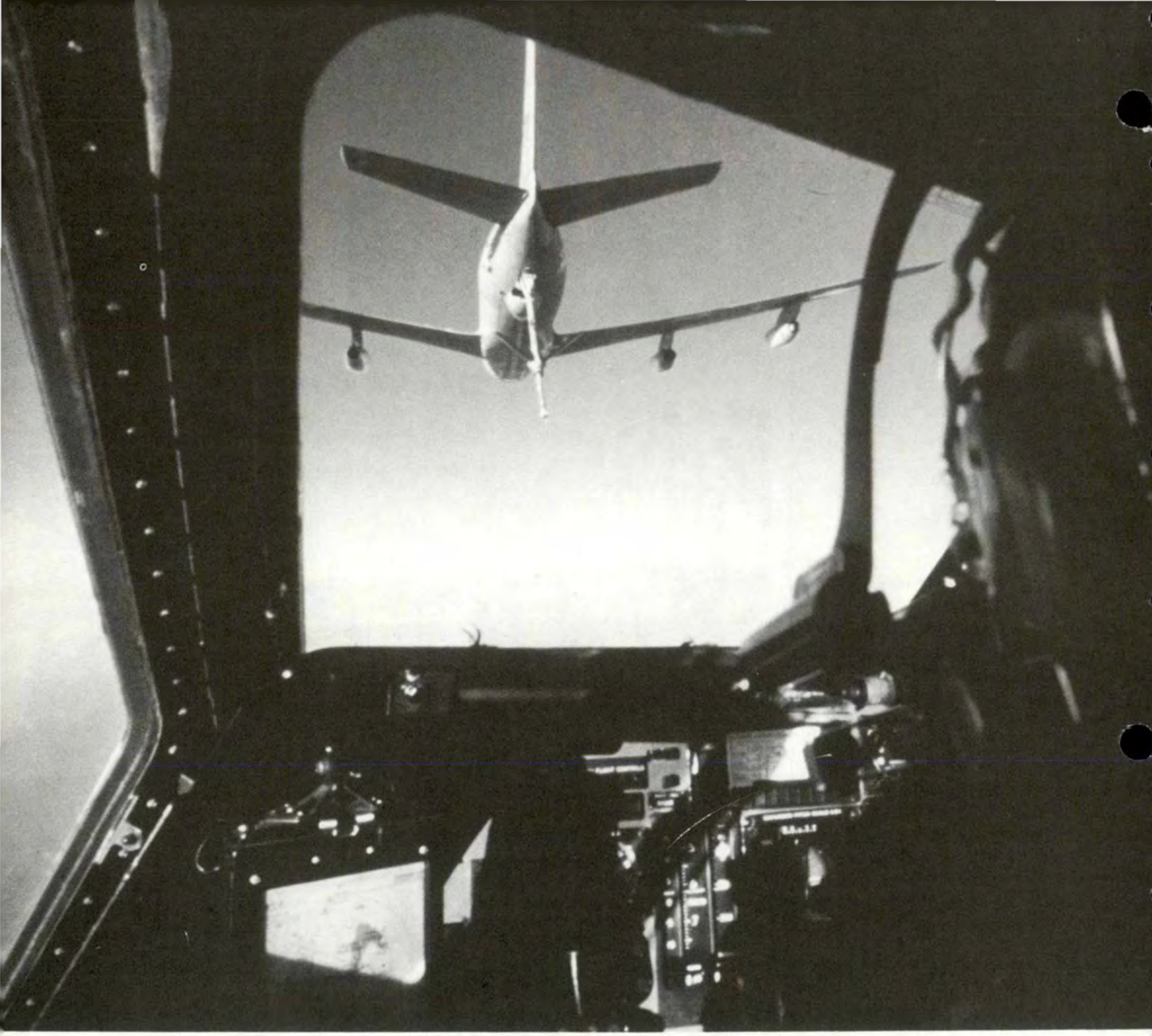


AIR REFUELING SCENE

MAJOR ARTHUR P. MEIKEL III
Directorate of Aerospace Safety

■ As our national strategy evolves, in-flight air refueling assumes more importance. There are more and more requests for tanker support. Tanker crews can expect to see increased refueling with Navy and Marine receivers. As the scope of air refueling operations has increased, efforts of numerous support agencies to standardize Air Force, Navy, Marine, and NATO

As air refueling assumes more importance, tanker support will be requested more frequently. Air Force tanker crews can expect an increase in reciprocal refueling with Navy and Marine Corps aircraft.

refueling procedures and hardware have increased. AFISC is one of those support agencies, and the tool we use to improve equipment and procedures is the mishap report. Data from mishap reports are useless unless utilized. Information from mishap reports is presented for your use. Points of interest are highlighted, and some analysis presented. However, because of the lack of operational information, responsibility for the final analysis and application falls to the MAJCOM and the individual crewmember.

This article will present current areas of interest, including air refueling mishap trends over the last few years, and summarize the 1983 mishap trends through 30 November 1983. Our data represent only "reported" air refueling mishap information. Not all sheet metal dents and scrapes reach Class C damage threshold limits. We are also aware that small fuel leaks, spray, and siphoning are common and not reportable through safety channels unless there is an obvious hazard. Minor equipment malfunctions aren't counted in safety reports unless damage results. We know there are things happening out there that don't reach safety channels.

Probes and Drogues

Another area of interest is probe and drogue refueling. Since Navy, NATO, and Marine receivers are probe and drogue equipped, our interest in that type of refueling is being rejuvenated. The next revision of AFR 127-4 will require that probe and drogue mishap information be sent to the Navy Safety Center. This includes HAP reports. Situations which could dangerously affect probe and drogue refuelings should be reported. Efforts to improve drogue refueling capability include replacement of KC-135 drogue hoses with programmed time replacement schedule after an initial change. We are also seeking more stringent inspection criteria for receiver probes in order to ensure timely replacement of worn probes. Tanker drogue pressure checks and breakaway checks will be required before use. Drogue storage and handling procedures are being revised.

How Much Is Too Much?

One of the more difficult things to judge is how much fuel spray, leak, or siphoning is too much. Judgment and knowledge of your individual weapon system tech data is required. Do you know the difference between a leak, siphoning, and spray and your required actions for each? In some cases, the decision is the boom operator's. In others, the receiver must make the decision to terminate refueling. In one instance, an F-15 experienced an explosion and loss of a panel due to ingestion of fuel into an electronics equipment area. The A-37 seems particularly susceptible to stalls/flameouts caused by fuel ingestion. In 1983, at least three A-37s experienced engine flameouts for that reason.

The Navy is also concerned with fuel ingestion. In a mishap charged to the Navy, a Navy A-4 refueling behind a KC-135 was lost over the Pacific after ingesting fuel, catching fire, and exploding. Investigation shows that potentially serious air refueling problems are not being reported through safety channels. In fact, evidence in this and other cases suggest that minor problems are not being adequately reported through maintenance channels either. Consequently, they aren't being fixed in either the Navy or Air Force. Seemingly small malfunctions can have serious consequences.

If all the refueling equipment on your aircraft doesn't work properly, get it fixed. Your 781 writeup to maintenance can prevent a serious problem on the next flight.

The Numbers

Air refueling mishap statistics have continued to be low in recent years despite the introduction of new tankers and receivers.

Air Refueling Mishaps

Year	Mishaps	Rate/10,000 Hrs
1978	50	1.84
1979	40	1.48
1980	32	1.27
1981	30	1.15
1982	35	1.32
1983	32	1.27
(thru 30 Nov)	(35 forecast)	

continued

Do you know the difference between a leak, syphoning, and spray and their respective countermeasures? One F-15 experienced an explosion and loss of panel because of fuel ingestion into an electronics equipment area.

There were two KC-10 air refueling mishaps reported in 1983. The above rate includes both C-135 and KC-10 flying time. As you can see, the rate is one of the three lowest in recent years and, in fact, in the Air Force's history. The rate can go lower, obviously.

What you know about problems and do as a receiver pilot or boom operator plays a great part in the Air Force mishap rate. In order to help you prevent mishaps, let's look at problem areas over the last few years.

Traditional Problem Areas

Mishaps have occurred for various reasons over the last 6 years. There have been five different areas where mishap trends have occurred. Only one of these unfavorable trends has repeated — the night closure/overtake problem. A summary of unfavorable trends is:

- B-52 night closure mishap — 1980
- Inadvertent boom contacts with receiver — 1981
- KC-10 nozzle ring separations — 1981-82
- B-52, C-141, and E-3 night closure mishaps — 1982
- Fighters involved in 63 percent of mishaps — 1983

Night Closure Mishaps

In 1980 and 1982, trends of large aircraft exceeding inner limits at night occurred. In 1982, there were 11 large aircraft mishaps of this type. All large receiver pilots and boom operators evidently had trouble recognizing slow closure at night or in weather. We had four such mishaps in November and October 1983. These recent mishaps occurred after an 8-month period (Jan-Aug 83) in which only one large aircraft experienced ice shield damage due to closure. That was a C-130 in January 1983. Maintain a constant awareness of your position and the willingness to disconnect as inner limits approach.

Congratulations to large aircraft receiver pilots and boom operators for recognizing and greatly reducing night closure mishaps for an 8-month period in 1983. Keep working on it.

Inadvertent Boom Strikes

Since the adverse trend in 1981, inadvertent boom strikes have remained at lower levels. There were two strikes reported in 1982 and six in 1983. With higher reporting thresholds, minor dents and scratches may not all be reported. Darker paint schemes, such as on some C-5 aircraft, are making the boom operator's job more difficult. The fin tip mounted floodlight should help for some receivers; however, it reportedly does not illuminuate camouflage paint schemes sufficiently. This is an area that will always require attention.

KC-10 Nozzle Separations

The KC-10 nozzle separation problem has not recurred since hardware modification.

Fighter Mishap Trend

Fighters were involved in 63 percent of the mishaps in 1983 — an increase from the previous year. In 1982, there were 14 fighter refueling mishaps; through November 1983, there were 20. The F-4 remains at the top of the list as it has for the past few years. However, the F-4, including Navy/Marine receivers is similar to the 1982 rate (7 vs 8). The rest of the fighters' numbers resulted from increases in inadvertent boom contact, initial A/R training in F-106 aircraft, and problems with staying within the refueling envelope.

The 1983 Experience

Data from 1983 through 30 November are presented for your use. In analyzing the data, you should consider trends in your weapon system, exercises, increased training, etc. A source in SAC has suggested that the number of mishaps may be influenced by a decrease in air refuelings and shortened times on track. Each weapon system should compare their air refueling exposure to air refueling mishap data to see how they are progressing and consider areas for improvement.

Aircraft involved in 1983 mishaps were:

C-141	4	B-52	3	A-10	1
C-135	2	F-4	7	A-7	1
E-3	2	F-106	4	F-15	1
C-130	1	F/FB-111	5	A-37	1

The C-141 led large aircraft in number of mishaps in 1983. The mishaps have resulted from the receivers' inability to maintain the air refueling envelope and the resulting closure or brute force disconnects. In an overall comparison, the C-141B had 10 mishaps from 1981 to 1983. The C-135 had four and the B-52, 15 in the same time period.

In 1983, the biggest trend was student pilot involvement in air refueling mishaps. An example of this trend is the F-106. Two mishaps occurred in a 1-week period during initial training. The definition and execution of "stabilize" must be reemphasized. The peer pressure to get the offload on the first or second air refueling is high.

A large number of incidents involve students, requals, initial quals, etc. The real number of such mishaps is difficult to determine from safety reports since a majority of our missions involve training. All mishaps count, however, and there is always a great burden on IP and AC judgment.

This information has been presented to let you know how your weapons systems system compares with others. By looking at the mishap information of other groups, you can avoid their errors. As NATO and Navy refuelings increase, we will be looking at more, varied data in an attempt to improve in-flight air refueling. ■

SAFETY REPORT

THE HEAVIES

Last month in *Flying Safety* the AFISC weapons system project officers covered the 1983 records for fighter aircraft. This month, the big guys get their chance. In the following pages we look at the bombers, transports, and helicopters, both their records for 1983 and the prospects for '84.

The purpose of these reports is to help you: the aircrews, commanders, supervisors, and maintainers to identify the key areas for emphasis in 1984. Last year was a pretty good one for flying safety. Now we need to work even harder to make 1984 better than '83.

B-52

MAJOR JAMES R. HUDDLESTON
Directorate of Aerospace Safety

■ Since their introduction into Air Force service in 1955, 742 B-52s have been built. In the past 28 years, the B-52 fleet has experienced 88 Class A flight mishaps (through the end of 1983). These mishaps have resulted in 70 aircraft destroyed and the loss of 305 lives. Additionally, the B-52 has amassed 6,446,674 flying hours, resulting in an overall Class A rate of 1.36. Last year, the D models were retired, leaving 166 Gs and 96 Hs in the active fleet. This article will address the B-52's recent mishap experience, trends, current actions and modifications as well as this year's forecast.

Mishap Experience

Unfortunately the 1983 prediction was correct with one Class A mishap that cost us seven lives, and resulted in a .95 rate. There were no Class Bs, but we had 116 Class C mishaps.

Since 1974, operations and maintenance-related Class A flight mishaps stand at six each. However, the last 3 years reflect three operations-related mishaps compared to one for maintenance. Figure 1 shows the phase of flight as well as maintenance or operations-related caused mishaps. Some things just don't change; takeoffs and landings are still critical phases of flight.

B-52 Class A Flight Mishaps (1974-83)

Phase of Flight	Ops-Related	Mx-Related	Total
Engine start		1	1
Takeoff	1	1	2
Climb	1		1
Cruise		2	2
Low level	2		2
Descent	1		1
Landing	1	2	3
Total	6	6	12

Figure 1

NOTE: For all you nonsafety types, a flight mishap is classified as Class A when an airplane accident results in a fatality (or permanent total disability), the aircraft is destroyed, or when the total damage cost exceeds $500,000. A Class B mishap is an accident that results in cost between $100,000 and $500,000 or a permanent partial disability. Class C mishaps are mishaps that cost $1,000-$100,000, and High Accident Potentials (HAPs) are significant hazards to crew or aircraft.

The 116 1983 Class Cs are broken out as follows:

Birdstrikes	36	Life Support	7*
Engines	15	Miscellaneous	5
Extended Take Off Rolls	9	Wheels/Tires/ Brakes	5
Hydraulics	9	Electrical	4
Weather	9	Flight Controls	4
Dropped Objects	4	Landing Gear	2
FOD	3	Air Frame	1
Fuel	2	Pneumatics	1

*Of these seven, four were physiological episodes.

Class C mishaps (including HAPs) are important because of the dollar cost and the trends they may indicate.

What do these mishaps tell us? Birdstrikes are still with us, so develop a plan and react accordingly. Tell others of known bird activity, and keep your visors down! The engine problems are varied, with no common trend; however, know your restrictions (what systems are lost or affected), and plan accordingly when an engine or engines are inoperative.

HQ SAC, Boeing, Oklahoma City (home of the B-52 system manager) and Ogden Air Logistics Centers are working the extended take off roll problem. B-52 brake parts are being evaluated for proper specifications. Hydraulics system analyses include hydraulic line breaks, pumps failing internally (some due to fluid loss), and pressure transmitter failures. TCTO 1B-52-2359 has been completed so hydraulic reservoir air pressure relief valves have been inspected. This should preclude overpressurization problems. The weather mishaps include five lightning strikes, three static discharges, and one case of icing.

The life support mishaps were varied and no trend information is available. There were four physiological incidents; these included two rapid decompressions (hatch wasn't properly locked and a worn hatch seal), one incident of hyperventilation, and one case of hypoxia (oxygen hose became disconnected).

Current Actions

There are currently three safety modifications.

- TCTO 1B-52-2325 replaces 5 amp circuit breakers with 7.5 amp CBs for the auxiliary fuel pumps. This mod will reduce the possibility of tripped circuit breakers and resultant trapped fuel. Eighty-two percent of the fleet has been completed. By the time you read this, the modification should be finished.
- TCTO 1B-52-2332 consists of inspecting for cracks and adding doublers to the electrical connectors on fuel main manifold interconnect valves 29 and 29A in the center wing tank. Damaged or deteriorated electrical connectors will be replaced. Seventy-eight percent of the G's and H's are done, and the mod was scheduled to be completed 30 April 1984.
- Modification Number F43003A will change the engine water injection system electrical circuitry. This mod will deactivate both pod engines if one throttle is reduced. It also prevents restart of water injection on that pod.

There are other ongoing modifications that are classified "mission essential." Some of these have an impact on safety and are worthy of mention.

- TCTOs 1B-52-2255 and 2256 and commodity TCTO 4S1-57-502 affect the crosswind crab electrical circuit and replace the centering switch. TCTO 2255 is the only one still open. Forty-two aircraft have been modified; completion date is January 1986.
- TCTO 1B-52-2305 will replace the current fuel quantity indicating system with solid state analog, pointer-type indicators, new all-metal tank unit probes, new wiring harnesses and connectors, and associated hardware. Installation for kit proofing/TCTO verification has been completed. This depot level mod should be completed by June 1988.

To provide a new or improved operational capability is part of the definition of a Class V modification. Two B-52 Class V mods will be discussed.

- TCTO 1B-52-2253 is the incorporation of the offensive avionics system (OAS) mod. This will replace the majority of the bomb-nav system with state-of-the-art digital equipment. This mod should be completed by December 1986.
- TCTO 1B-52-2291 will change the power source for the ARC-164 UHF radio to the battery bus allowing use of the radio without external power or aircraft generators operating. Presently, 85 percent of the B-52s are finished. Again, by the time you read this, the fleet should be completed.

The Future

Based on the mishap history of the B-52, the Center is predicting that 1984 will end with one B-52 Class A and two Class B mishaps. The Class A will be a collision with the ground; one Class B will involve problems with the hydraulic or pneumatic system; birdstrikes will account for the other. The first Class B prediction is based on the extended take off rolls or the rudder/elevator system. The second Class B caused by birdstrikes is expected because of the exposure rate — just look at 1983's birdstrikes. The prediction is one area where the Center hopes to be proven wrong. Only you in the field can do that.

It will take continuous efforts of crewmembers, maintainers, supervisors, and commanders at all levels to achieve a zero mishap rate for 1984. That's our goal; make it yours if it isn't already. ■

The B-52 fulfilled its predicted mishap rate in 1983 with one Class A resulting in a .95 rate. There were no Class Bs and 116 Class C mishaps.

C-5

After 15 years of service, the C-5 still holds some admirable safety records. In 1983, however, two Class A and two Class B mishaps equated to a loss of more than $60 million.

MAJOR J.C. PARRY
Directorate of Aerospace Safety

■ In 1983, the C-5 entered its 15th year of service. Unfortunately, its mishap rate left something to be desired. The C-5 had two operations-related Class A mishaps and two Class B birdstrikes for a loss of airlift resources in excess of $60 million.

The first two mishaps were in January. A C-5 night training mission was 4 miles out on final approach when a flock of snow geese (practicing their night flying) impacted the aircraft. Despite severe damage to Numbers 1 and 3 engines, the crew successfully completed the approach to a full stop. The next mishap, also at night, occurred during a heavy-weight take off. Because it was night and there were low ceilings (300 feet), no one saw the snow geese until the crew heard the thumps on the aircraft and saw Number 4 engine start to die. Over 60 snow geese impacted the aircraft. The Reserve crew did an outstanding job returning the very heavy C-5 to the airfield with their limited available thrust.

The results of these two birdstrike mishaps, plus a similar Class B mishap that occurred several months before, highlighted the serious bird hazard condition around Dover Air Force Base. It behooves all pilots operating in and out of Dover to be aware of the bird refuges around the base. Some help may be on the way. This base is now using a special radar mode that can track flocks of birds and allow radar vectors for aircrews to avoid the birds.

The next mishap occurred while the aircraft was flying a PAR approach into a base with a 14-knot crosswind. The weather was reported to be partially obscured, 200-feet overcast, RVR 2, 400 feet. The aircraft impacted 212 feet short

The C-5 system should grow and improve its reliability and safety when the C-5B joins the fleet.

of the runway and 12 feet below runway elevation. It then became airborne again, landed on the runway, and slid to a stop. The aft main landing gear were destroyed on impact, and the right forward main landing gear broke off and was crushed under the aircraft as the aircraft went down the runway. The crew egressed safely. Cost was in excess of $54 million.

The last serious mishap was in the fall. It was an annual composite checkride for the aircraft commander in the left seat with a flight examiner in the right seat. On a no-flap full stop landing, in VMC conditions at night, the aircraft came to a stop on the runway with the gear up and locked. The crew egressed safely. Cost was in excess of $2 million.

In addition to these mishaps, the aircraft experienced 28 Class C and 18 High Accident Potential (HAP) mishaps. Thus, the 1983 Class A mishap rate was 3.9 mishaps per 100,000 hours (Air Force rate = 1.73). The Class B mishap rate was also 3.9.

The C-5 still holds several enviable safety records. First, there has been only one fatal mishap in its history; second, only two aircraft have been destroyed as a result of flying mishaps; and, lastly, 77 of the original 81 aircraft produced are still flying. With the C-5B soon to join the fleet, the C-5 system should continue to grow and continue to improve its reliability and safety.

Logistics Mishaps

The number of logistics-related mishaps stayed about the same as 1982. There was a noticeable decrease in TF-39 engine-related problems. Gear-related mishaps remained the primary culprit in keeping the logistics mishap number high.

The only engine mishaps in 1983 were three engine flameouts (on the ground) and a sixteenth stage bleed duct failure. The engine flameout problem received attention from a blue ribbon team which recommended a temporary solution. This, coupled with an ongoing study, has the problem in check.

Landing gear mishaps stayed at the same level. Completion of the Pacer Pup modification will do a great deal to reduce this number. Eight of the mishaps were directly related to this modification program. The remainder were spread out over the landing gear spectrum to include: a broken MLG slot door, a bearing sleeve failure, broken main landing gear door which dropped off in flight, a nose landing gear switch card failure, and a lower bearing adapter failure. As you can see, despite improvements in the gear system, mishaps still occur and we need to be prepared to handle them.

Flap/slat problems continue to crop up (or drop down) but don't usually cause a serious controllability problem. All these mishaps were due to different malfunctions, so no trend was noted.

There were several mishaps in the OTHER logistics mishap category. They include: Tech Order versus regulation guidance on how fast to fly with the nose landing gear down; loose rudder pedals; pitch trim wired in reverse; an abrupt pitch flight control problem and a similar autopilot pitch control problem; and two dropped objects (a DCPIR and a fire bottle access panel).

continued

There has been only one fatal mishap in the C-5's history and 77 of the original 81 aircraft produced are still flying.

The predictions for the C-5 in 1984 include one ops-related/crew error Class A mishap and one Class B birdstrike. This is not a goal — with your help we can beat that prediction.

C-5 continued

Figure 1
C-5 Flight Mishaps (1979-83)

Class	'79	'80	'81	'82	'83
A's	0	1	0	1	2
B's	2	3	1	2	2
C's	26	26	20	31	28
HAPs	21	23	15	14	18
Total	49	53	36	48	50

Figure 2
Types Of Mishaps (1982 vs 1983)

	1982		1983	
LOGISTICS	31½		29	
Engines		13		2
Landing Gear		13½		13
Slats		2		4
Other		3		10
OPERATIONS	2½		5	
Taxi		1		2
Other		1½		3
OTHER	14		16	
Birdstrikes		10		5
Cargo Spills		2		6
Physiological		2		2
Other		0		3

Three mishaps in the OTHER category are worthy of note. The first was a MAC aerial port that managed to load 45 pounds of corrosive material among 65,000 pounds of Class A explosives. The port personnel discovered the error and contacted the airborne aircraft as it was flying over the ocean. The crew then separated the corrosive cargo from the explosive. The other two mishaps were both rapid decompressions (RD). The reasons for the RDs were different but they pointed out that quick and sure responses are required of our aircrews to prevent a catastrophe. As the only trained physiological experts on board when an RD occurs, we need to know our procedures and provide quick and proper response to our passengers. Several people lost consciousness during these mishaps, including a crewmember, so stay proficient on your procedures.

Operations-Related Mishaps

The two most serious mishaps in this category have already been discussed. Two taxi mishaps occurred at different locations. One occurred during a 180-degree turn that missed, and the other involved moving too fast on a wet, slushy runway. In the OTHER category the problem was aerial refueling.

Operations-related mishaps have received a lot of attention in MAC since all three Class A mishaps experienced in 1983 were of this type (two C-5s, one C-130). Operations-related mishaps are usually the worst ones — a destroyed aircraft with a high probability for fatalities. It is only through your professionalism and conscious effort to ensure safe mission accomplishment that we can reverse this trend.

Other Mishaps

Five birdstrikes including two Class B mishaps continue to demonstrate that the bigger you are, the easier it is to get hit. Already in 1984, MAC has had another near-Class B birdstrike mishap.

Cargo spills again overflowed the bounds of acceptability. Improper preparation and lack of supervision to ensure proper preparation and certification are the root causes of almost all of these mishaps. Aircrews, however, can be the saving grace in preventing this type of mishap. The aircrews are the final check before bad cargo gets loaded and airborne. Despite the time constraints to move the mission, a little extra care in checking out this cargo (before you have to clean up the messy spill) could go a long way toward preventing these hazardous situations from occurring, not to mention time saved in mishap report preparations.

The two physiological mishaps involved both a pilot and crew chief who discovered how uncomfortable the floor can be when getting up from a short siesta. Please take your time to fully wake up before you move too much.

The other three mishaps involved FOD to an engine (on a C-5?), a lightning strike, and a nasty runway centerline light that rose out of the pavement to smite the C-5 on a touch-and-go.

1984 Expectations

The prediction for 1984 is more of the same: one C-5 Class A mishap as a result of an operations/crew related error; and a Class B mishap birdstrike. Logistically speaking, The C-5 airframe continues to improve and become more reliable and safer to fly. Hopes for the B-model airframe are similarly high. The birds won't go away; cargo spills will continue; and landing gear mishaps could occur anytime. Remember the prediction is not a goal. It is up to you, the aircrews, to eliminate the operations factor (dumb) mishaps and beat the 1984 predictions. ■

C-9

MAJOR JOHN J. COLSCH
Directorate of Aerospace Safety

■ The USAF fleet of C-9's further reduced its lifetime Class A and B mishap rates in 1983. Through dedicated professionalism of C-9 crewmembers, maintenance, and supervision, the C-9 fleet had another Class A and B mishap-free year. The fleet is approaching 400,000 flight hours with a total of two Class A's and one Class B.

The C-9A aeromedical evacuation aircraft experienced five Class C mishaps in 1983. These included two birdstrikes, one engine shutdown from no throttle response, one FOD engine, and one runway departure.

The only Class C mishap reported by the three C-9C special air mission aircraft was the loss of consciousness by a passenger specialist. Heavy exercise, air sickness, inadequate crew rest, and inadequate fluid replacement appear to have been causal.

The two mishaps appearing to have the highest potential for serious consequences were the loss of throttle response and the runway departure mishaps. Human factors played a part in both.

Investigation of the C-9A mishap involving loss of engine control revealed the throttle linkage had disconnected because a threaded assembly had not been safety wired. Loss of 50 percent power in a critical phase of flight could have disastrous results. Following the technical orders is a must.

The other Class C mishap could also have resulted in a destroyed aircraft. A C-9A departed the runway during landing. In an effort to make up time during an aeromedical evacuation mission, a steep, hot approach was flown. Additionally, the spoilers were not armed. After the aircraft landed hot and long, without the spoilers, it departed the end of the runway.

Although one of the above mishaps involves ground maintenance personnel and one involves a flight crew, the symptoms are similar. Both mishaps reveal a failure to follow established procedures and a reliance on memory versus using checklists, in order to expedite mission accomplishment.

The C-9A air evac and the C-9C SAM both are demanding missions. Perceived mission urgency must not push judgment to the "go no matter what" point. As the perceived urgency increases, the tendency to hurry and cut corners also increases. When this occurs, an awareness of potential consequences must also increase. Mission urgency must be tempered by concern for the welfare and safety of all on board your aircraft.

In 1983, a civilian DC-9 cabin fire resulted in the death of 23 passengers. The fire started in the area of the aft lavatory flushing pump motor. Several service difficulty reports from the air carriers reported overheating of DC-9 flushing pump motors. Douglas Aircraft Company is conducting a review of lavatory toilet flush systems. Representatives of the Bomber/Transport Branch of the Air Force Inspection and Safety Center observed the investigation and public hearings of the mishap. Following the hearings, AFISC distributed an ALSAFECOM on passsenger protection measures and passenger oxygen systems. A briefing on the DC-9 fire was developed and provided to all MAJCOMs. The C-9 system manager distributed a C-9 TCTO in February this year directing inspection of these systems. As changes in the electrical circuit protection for the flush system are developed, the system manager will direct modification of USAF C-9s.

While visiting the CONUS C-9 units, inspection of on-board smoke goggles revealed several were deformed and unusable. Although C-9s have had a very safe record, emergency equipment must be kept serviceable. On occasion, aircrews should check the emergency equipment, even though this may not be part of their normal preflight.

Another vital safety concern is the acquisition of strobe lights for the 20 USAF C-9As. The USAF contracted for a C-9 strobe light modification proposal. That proposal should be submitted within the next couple of months and will, hopefully, be accepted. If so, strobes for the C-9A may become a reality in the near future.

The C-9 system — crews and fleet — have much to be proud of. The missions demand a large measure of professionalism and judgment by supervisors and operators alike. Keep 'em safe; keep 'em flying. Make 1984 another Class A and B mishap-free year. Only you can do it. ■

KC-10

MAJOR ARTHUR P. MEIKEL III
Directorate of Aerospace Safety

Perhaps the greatest threats to the KC-10 fleet are complacency and lack of crew discipline. Over half the mishaps in heavies in 1983 wre ops-related. The KC-10 crew force is just as vulnerable as anyone else. Let's be alert.

■ In its 3 years of service, the KC-10 fleet has logged 21,000 flying hours without a Class A or B flight mishap. Twenty-one aircraft are now in service at March and Barksdale Air Force bases. Seymour-Johnson was recently announced as the third KC-10 base to help accommodate the planned total of 60 aircraft.

In 1983, there were seven reported Class C mishaps. Incidents involved FOD, hot brakes, hydroplaning, and four air refueling mishaps. There have been 28 Class C mishaps in the aircraft's history. Sixteen of them have been air refueling mishaps. Six nozzle problems occurred but have not reappeared since March 1982 when a stronger nozzle connection was engineered and installed. There have been six drogue-related mishaps in the aircraft's history, counting one which occurred early in 1984. Two of these were maintenance-related, and one involved fuel ingestion and engine flameout by an A-37 receiver. The other three (Nov 82, Nov 83, and Jan 84) all involved a drogue loss to Navy/Marine receivers. It appears that the 10-foot-per-second takeup capability of the hose reel is being exceeded and severe hose oscillations result in loss of the drogue. The limitations of the Air Force drogue are being stressed by the Navy to their pilots.

There are no Class A mishaps forecast for the KC-10 in 1984. Logistics hazards seem to be at a minimum, based on the history of the aircraft. Perhaps the greatest threat to the weapons system is complacency and crew discipline. This is based on the record set by large aircraft in 1982. All were operations related. Fifty-six percent of all mishaps in 1983 were charged to ops. It seems that the "dumb" type of mishap is on the increase. The KC-10 crew force is as vulnerable as any to the operations mishap. ■

C-130

MAJOR JOHN J. COLSCH
Directorate of Aerospace Safety

■ The C-130 operators and maintainers have reason to be proud of their 1983 safety record. The number of Class A flight mishaps was cut in half over the previous year. In a year of increased maintenance and operator workload, safety was not sacrificed. In a year where the C-130 fleet was called upon for contingency operations, the challenge was met.

The 1983 mishap forecast was three C-130 Class A's and one Class B flight mishap. This forecast was based upon past experience, projected flying time, and risk exposure. Although the forecast predicted a relatively low number of mishaps, you all improved on that.

Let's take a look at 1983's C-130 mishaps. The one Class A flight mishap occurred when a C-130 impacted the ground shortly after an exercise airdrop attempt. The aircraft stalled and crashed. All six persons on board were fatally injured. The Class B flight mishap was a landing with a partially extended gear. In addition to the Class A and Class B flight mishaps, a C-130 was destroyed by a ground fire. Another received Class B damage in a contractor mishap brought on by overpressurizing a wing fuel tank during fuel transfer.

C-130 Class C and HAP mishaps increased from 262 in 1982 to 269 in 1983. Increases in lightning strikes, birdstrikes, and FOD mishaps require more action to prevent these type mishaps. However, instances of life raft deployments, dropped objects, and cargo leaks are decreasing, and that's encouraging. Flight control mishaps and losses of power or shutdown of two or more engines remained relatively constant.

C-130 MISHAP SUMMARY

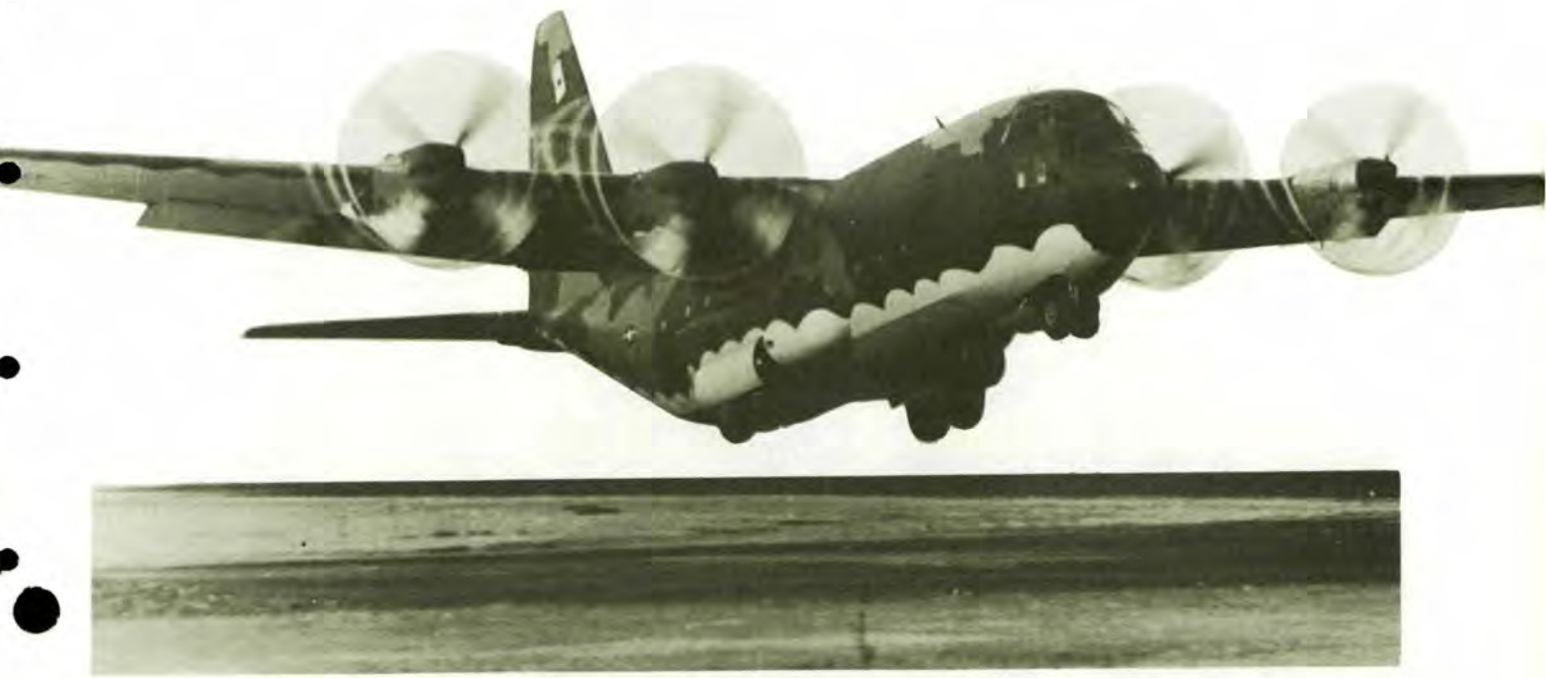
	1982	1983
CLASS A's	2	1
Rate/100,000 flight hours	.5	.3
Destroyed	2	1
Fatalities	34	6
CLASS B's	1	1
Rate/100,000 flight hours	.3	.3
CLASS C & HAPS	262	269
Rate/100,000 flight hours	68	72
Dropped Objects/Lost in Flight	15	8
Life Raft Deployments	8	3
Flight Control Mishaps	12	12
FOD	25	30
Lightning	12	17
Birdstrikes	15	21
Cargo Leaks	9	6
Two-engine Shutdown/ Flameout/Loss of Power on Two or More Engines	19	15

Five 1983 Class C and HAP mishaps deserve special attention. They include inadvertent contact with water during low level, a gear-up touch-and-go, a physiological mishap involving loss of consciousness of an instructor pilot, a series of fuel contamination mishaps, and a smoke and fumes mishap.

The inadvertent water contact was too close to being a Class A mishap to be ignored. Discipline is the key to survival during low levels in a combat environment. This same discipline demands adherence to minimum altitudes established in training regulations. The goal remains the same — that of accomplishing the mission and surviving to fly again.

The C-130 gear-up landing fol-

continued



One C-130 Class A mishap occurred in 1983, as opposed to the three predicted. For the varied missions the C-130 fleet is tasked to perform, its mishap rate is an enviable accomplishment.

C-130 continued

lowed the common scenario. It includes multiple approaches and landings, training/evaluation flights, simulated emergencies or unusual configuration, and then breaking the normal sequence/habit patterns of the pilot. To help preclude recurrence of gear-up landings, modification of the C-130A/D landing gear warning system is now nearing completion. The modification provides the same warning capability as that of later model C-130s. However, warning systems alone do not prevent gear-up landings.

When the pilot is overloaded with simulated emergencies during multiple approaches, the potential for a gear-up landing is high. The other crewmembers in the cockpit should be aware of the gear-up potential and to ensure proper landing configuration. The responsibility ultimately rests with the pilot to make sure the gear is down, but good crew coordination has prevented many unhappy landings.

The third mishap of concern involved an instructor pilot who was not feeling well before a flight but who flew anyway. This, combined with poor eating habits and light turbulence, resulted in nausea. In the efforts to control his vomiting his air passage became restricted, decreasing the blood flow to his brain. The pilot lost consciousness and thanks to quick action by the flight engineer and student pilots aircraft control was maintained. After the pilot was revived, the landing was uneventful. That stomach ache at or just prior to showtime during flu season, is the time to advise the unit supervisor that a rain check for the flight and a visit to the flight surgeon is in order. To gut it out for one more flight could be a fatal mistake for more than one.

The fourth mishap involved a C-130 which had taken on fuel at an enroute field, then experienced power response problems on several engines. After landing, fuel contamination checks were conducted. Although the fuel sample from the aircraft showed a higher than normal level of particulates, the fuel was judged to be good. The fuel filters were checked, and the aircraft was ground run with no discrepancies. On the next leg of the flight, a similar loss of power occurred, and again the engines were ground checked OK. You guessed it, on the next leg to the home station, the power control problem happened again, only this time, three engines flamed out during landing rollout. This time, all four fuel controls were removed and submitted for CAT I MDR. Although two of the fuel controls were lost in shipment, the two other fuel controls showed high contamination levels. The contamination was high enough to cause loss of power control. The C-130 system manager is working with the engine item manager to develop engine fuel contamination checks which will reduce mishaps of this type.

The final mishap involved smoke and fumes. The flight engineer went back to the cargo compartment to investigate the fumes reported by the loadmaster. After smelling the fumes, the engineer directed all crewmembers to go on oxygen. Recovery and landing were normal. However, although all crewmembers were checked by the flight surgeon and released, both the loadmaster and engineer experienced severe headaches and shortness of breath 10 hours after the mishap. The flight engineer reported back to the hospital where he remained on oxygen in intensive care for the night.

What happened? Heating of the vinyl coated nylon of the insulation blanket by a bleed air leak produced toxic gasses. These gasses caused respiratory distress; in sufficient quantities this can be fatal. Smoke masks with 100 percent oxygen

In 1983, C-130s experienced half as many Class A mishaps as in '82. Despite the increased maintenance and operator workload, safety was not sacrificed.

should be worn anytime smoke or fumes are present. Heating of vinyl under the right conditions will produce toxic fumes without smoke. Since the fumes can be released without smoke, extreme caution must be exercised when trying to locate the source of these fumes. Bleed air leaks on insulation blankets are a likely source. If acrid fumes are detected, 100 percent oxygen should be used and the aircraft landed as soon as possible.

Going on to logistics causes, the two major logistics safety concerns are structural integrity and blue foam. Included in the structural integrity concerns are wing cracks, engine longeron cracks, and cracked pork chop fittings.

Installation of new outer wing boxes on the C-130B/E and early H models is underway with the first aircraft due out in March 1984. Completion is scheduled for November 1988. While awaiting completion, vigilance is a must.

Detection of engine longeron cracks in 1983 resulted in inspections of engine longerons and engine longeron brackets. The inspections were timely in that numerous discrepancies were found and are now being corrected.

Cracks in C-130A pork chop fittings have been a recurring problem. Previously, cracked pork chop fittings were strapped or replaced with aluminum. Now they are replaced with steel fittings. It will be some time before all C-130As are retrofitted with these fittings.

As of our last count, there were 23 instances of C-130 blue foam fires. It is now accepted that the blue foam modification is an interim solution to fuel tank explosion suppression for the C-130. Efforts are underway to develop a more conductive foam and an onboard inert gas generator system (OBIGGS). Modification of the present C-130 blue foam package with metal cage surrounded by yellow foam is underway and will provide a greater margin of safety for refueling operations.

In May or June 1984, the Air Force, Air National Guard, and Air Force Reserve C-130s will pass the 10 million flight hour mark. As of 1 January 1984, the C-130 lifetime Class A flight mishap rate was 1.24 Class A's per 100,000 flight hours. For the varied missions the C-130 fleet is tasked to perform, that mishap rate is an enviable accomplishment. If the rate is to be further reduced, everyone involved in C-130 operations must continue to integrate safety into their jobs. Any one of us could be the individual who breaks the chain of events to prevent a mishap. The greater goal is still to get the job done. How we accomplish that today determines how well we'll fight when needed. So keep them flying, but safely. ■

When the pilot is overloaded with simulated emergencies during multiple approaches, the potential for a gear-up landing is high. Although the responsibility to make sure the gear is down is ultimately the pilot's, good crew coordination can prevent an unhappy landing.

C-21A

SQUADRON LEADER MARK A. LEWIS, RAAF
Directorate of Aerospace Safety

The avionics package supplied with the C-21A includes some of the latest equipment available in the civilian market, including dual flight directors and electronic CRT horizontal situation indicators.

■ The C-21A operational support aircraft has commenced operations with the USAF. Prior to its operational debut, safety officers from AFISC took an in-depth look at the safety history and features of the Learjet model 35. Some of the facts were of great interest to us, and I'd like to share them with you.

The Learjet model 35 received FAA certification in 1974. Since that time, more than 500 have been produced (the first C-21A is number 509). The Learjet model 35 had flown 1,420,000 hours by July 1983. The current fleet flying rate is in excess of 200,000 hours per year.

Since the Learjet model 35 was first certified, there have been three CONUS mishaps resulting in a classification of substantial damage, similar to a Class A. The worldwide history reveals five more destroyed aircraft, for a total of eight Class A mishaps. This mishap rate is impressive when you consider the range of civilian pilot experience and the diversity of countries involved. In the same period, the T-39

fleet has operated approximately 150 aircraft, with highly trained USAF pilots, and has experienced six Class A mishaps.

The Learjet model 35 was leased as an off-the-shelf business jet. The avionics package supplied with the C-21A includes some of the latest equipment available in the civilian market. T-39 pilots converting to the C-21A will enjoy equipment such as dual flight directors, including electronic cathode ray tube horizontal situation indicators. Other equipment includes: a standby attitude indicator, dual autopilot capable of coupled approaches, VLF/Omega long-range navigation system, and color weather radar. Many of these features have been sought as Class IVA mods for the T-39 but will be provided in this aircraft as standard equipment. This equipment should enhance the safety of Air Force operations in the C-21A, and that is good news indeed.

Some aspects of C-21A operations are new to the Air Force. This fleet of 80 aircraft has been leased for 5 years per airframe, with an option to then buy or lease for a further 3 years. All contract maintenance will be provided at each beddown base, even if in a war zone. However, transient alert will service the aircraft when they are away from a beddown base. If an aircraft is destroyed, it will be replaced; if one is damaged, it will be repaired. However, mishap reporting will still be in accordance with AFR 127-4, even though the cost of mishaps will not be charged to the Air Force.

The C-21A has some safety features designed into it to ensure it complies with the Federal Aviation Regulations Part 25 and Learjet model 35 product improvement. These features include:

- A variable pitch trim system which provides fast trim response in the low-speed flight regime and slow trim response in the high-speed regime.
- A stick pusher prior to the stall, designed to prevent an inadvertent stall. It can be physically or electrically overridden if required.
- A mach puller, designed to prevent the pilot from inadvertently entering the critical mach range.
- The trim in motion aural warning device which is a "clicker." It operates whenever the trim is activated and is designed to provide aural warnings of runaway trim conditions.

The lease contract for the C-21A calls for a mission capable rate of 85 percent or better at each beddown base, or financial penalties will accrue. If the rate drops below 70 percent, then the contractor will receive no contractor logistic support payments for that aircraft for that month. Needless to say, the usual mission capable rate should be greater than 85 percent. This compares very favorably with the T-39 fleet rate of less than 50 percent.

All aircraft conversions will be completed at Tucson, Arizona. The 4-week course consists of 40 hours of ground school and 20 hours of simulator time at Flight Safety International, followed by 7.5 flight hours. Thirty IPs will also be trained by Gates-Learjet Corporation. They will receive an additional 4 to 6 days training consisting of 16 hours of ground school; 8 hours in the simulator, and 6 flight hours. An additional 60-70 IPs will receive IP training from the Central Training Facility (CTF) at Scott AFB. They will receive their training at Scott after completing their initial qualification at Tucson. There is no intention of carrying out initial qualifications training at the CTF. Neither will IPs who are trained at Tucson receive further training at the CTF. These arrangements are subject to review after the last aircraft is delivered to the Air Force.

The civilian mishap history of the Learjet model 35 is very good, especially in the CONUS. Aircraft design and logistic factors do not appear to present a significant mishap potential during Air Force operations. The same is not true of operations factors. AFISC is forecasting one Class A operations-related mishap in the first 12 months of operations. This forecast is based on a complete review of the crew training and the problems associated with operating a new weapons system. Your objective should be to prove us wrong. A zero mishap rate is possible, but only you can achieve it. ■

Since its FAA certification in 1974, the Learjet model 35 has built an impressive safety record — a worldwide history of 8 Class A mishaps.

C-135

MAJOR ARTHUR P. MEIKEL III
Directorate of Aerospace Safety

■ The 1.73 Class A flight mishap rate experienced in 1983 was the lowest in Air Force history. The C-135 fleet did its part with zero Class A mishaps. In addition, no airframes were lost through ground mishaps.

The zero mishap figure is not that common in the aircraft's history. In 1957, there were no Class A (major) mishaps; however, only 4,500 hours were flown. There were zero mishaps in only one other year, 1978. In 1978, C-135s flew 272,000 hours; in 1983, we logged 258,731 hours.

As you read the good news about last year, I caution you not to rest on your credits. In my safety experience, it seems that too many attaboys are often followed by disasters. In the years 1958 and 1979, there were three mishaps each, both following on the heels of zero years.

An accident-free record shouldn't be considered an annual effort. A safe attitude is a consistent, continual process. In fact, the C-135 is approaching the 2-year mark without Class A mishaps — the longest period in C-135 history. The last two C-135 losses were in March 1982. For those of you curious about the worst C-135 mishap years, there were six mishaps in 1963 and again in 1972.

One KC-135 Class B mishap occurred in 1983 when it collided with an E-3 after refueling. While flying in close proximity, the wingtip of the E-3 hit the KC-135 inboard of the number three engine. There was damage to the tanker's No. 3 engine and front spar. Controls for the number four engine were severed which required a two-engine recovery.

By far the primary cause of C-135 mishaps in 1983 was air refueling. Tankers are still experiencing abrupt pitch changes while the receiver is in the contact position.

Another KC-135 was involved in a Class A air refueling mishap in 1983. In the mishap, charged to the Navy, an A-4 ingested fuel, caught fire, and exploded shortly after the crew bailed out. Improvements are now being sought for both the Air Force's drogue system and the Navy probe. Air Force crews should see improvements in drogue handling and test procedures soon. All drogue hoses will be replaced beginning in 1984.

A look at 1983 Class C mishap information shows consistencies and a few new trends. The number of HAPs and Class C's was down slightly from past years. In 1981, there were 155 reports; 167 in 1982; and 137 last year. The top four causes of C-135 mishaps remain unchanged from last year.

1982		1983
32	Air Refueling	31
31	Bird Strike	21
14	Physiological	15
11	FOD	13

These four types of mishaps make up 58 percent of C-135 reports. While FOD and bird strikes are part of the airport environment, to a large extent aircrews can directly influence physiological and air refueling mishaps.

The majority of physiological mishaps resulted when crewmembers became hypoxic after a loss of pressurization. It's important to check personal equipment for proper fit and operation. Also necessary is aircrew awareness of human and equipment limitations. Crewmembers who fly when they should be DNIF are the second greatest cause

In 1983, for the second consecutive year, the C-135 experienced no Class A mishaps. Also, no airframes were lost to ground mishaps.

of physiological incidents.

Information concerning air refueling mishaps is presented in a separate article in this issue (page 2). Meanwhile, watch out for unstable receivers.

Now that we've looked at the similarities over the last few years, let's look at some of the KC-135's successes and failures:

1982		1983
2	Lightning/static	12
1	Cartridge	0
10	Engine	5
7	Hydraulic	3
5	Fuel	3
5	Flight Controls	1
2	Generator	0
1	Autopilot	5

The most significant increase in any category was the jump in lightning/static discharge incidents from 2 to 12. Half of these incidents were reported as lightning strikes and half as discharges.

Six strikes occurred during April and May. The results were 10 cases of radome damage and two damaged vertical stabilizers. In one incident, the vertical fin floodlight was lost. Almost all static discharges had common circumstances of aircraft descent, near freezing level, and in precipitation. The increase in thunderstorm-related lightning strikes is unexplainable. If reporting is constant, it must mean crews are flying closer to thunderstorms.

Starting cartridge malfunction numbers are low. The low numbers are deceptive in that this type mishap can be reported in areas other than flight. Cartridge explosions have decreased from 7 in 1981 to 3 in 1982 and zero in 1983. The number of partial burns has greatly increased, however.

Engine, hydraulic, fuel, generator, and flight control trends are all favorable. This is probably a result of maintenance efforts and an extension of the overall improved logistics rates in the Class A area.

One serious Class C mishap involved a major fuel leak of approximately 10,000 pounds. The crew landed the aircraft safely despite fuel surrounding electronic components. If an abnormally high or low fuel tank reading exists, depressurization and a prompt landing could be in order. A TCTO to inspect fuel vent interconnects has been released to prevent this type of massive leak.

Reported autopilot mishaps are up slightly. While the logistics community directs funding to a new autopilot, keep a close eye on the system. Tankers are still experiencing abrupt pitch changes while the receiver is in the contact position. We can't afford a multiple aircraft loss. Crews should avoid the use of a malfunctioning autopilot for air refueling if at all possible. Stay alert.

The C-135 fleet is currently enjoying a long, mishap-free period. The last three serious C-135 mishaps have all been ops-related and two of them have resulted in collisions with other aircraft. A word to the wise: fly safe and keep your head out. ■

E-3A

MAJOR ARTHUR P. MEIKEL III
Directorate of Aerospace Safety

■ At the end of 1983 the TAC E-3A had flown a total of 113,229 hours since it became operational. Last year, the fleet flew 29,733 hours. There have been no Class A mishaps in the aircraft's history. E-3A crews have been highly successful in helping the Air Force achieve our low mishap rate. However, the fleet experienced its first Class B mishap this year. The final report was released in early February. Crew discipline, adherence to regulations, supervision, and exceeding personal capabilities were all topics of discussion.

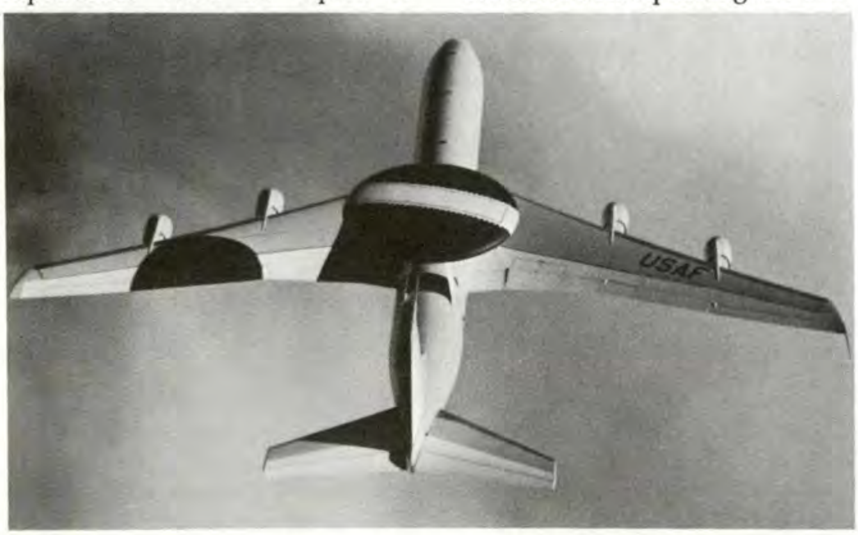
Operating from a forward operating location thoroughly stretches the reins of command. When deployed, a larger share of responsibility for mission success (spelled S-A-F-E-T-Y) rests with the crew. With the relatively low experience of a normally highly supervised crew force, the new freedom can pose unexpected traps.

Decisions and actions normally accomplished by supervisory staff at home base now fall upon the deployed personnel and crews.

Aircrews accomplishing the mission in a different supervisory environment is not new. Individuals and units have often operated on their own, sometimes in combat situations such as Vietnam and, more currently, Grenada. History has documented their successes and failures. History books for crews are not rare or hard to find — most are called regulations. Crews have to know the regulations, but more importantly, have the integrity and self-discipline to adhere when in less than normal supervisory situations. Mishap costs require it. Our professional integrity demands it.

Class C experiences for the E-3A in 1983 consisted of 12 mishaps. Five were physiological mishaps, two occurred during air refueling, two were birdstrikes, two were engine-related, and the other involved engine pod contact with the runway. Four of the five physiological mishaps continued last year's trend of crew illness and sinus block problems. The two air refueling mishaps occurred on long operational missions under demanding circumstances. Pilot fatigue was a factor in both mishaps.

Overall, the E-3A community produced an excellent safety record while flying long, complex missions away from home station. Congratulations to the AWACS community for exceeding 100,000 flying hours without a Class A mishap. Keep up the good work. ■



Not only have there been no Class A mishaps in the E-3A's history, E-3A crews have been highly successful in helping the Air Force achieve our low mishap rate.

C-141

MAJOR J.C. PARRY
Directorate of Aerospace Safety

■ In 1983, the C-141 completed its 20th year of service — one of the most successful and busy years yet. The strategic airlift workhorse, whose tactical airdrop mission seems to increase daily, had an outstanding year with no Class A mishaps. This feat was last matched in 1972. In 1983, the "stretched" C-141B flew in many different roles and many different places. Whether it was as a strat airlift, airevac, or airdrop aircraft in Lebanon, Grenada, Diego Garcia, or Chad, the C-141 performed superbly. As capabilities increased (size and air refueling), so have the tasks the aircraft and aircrews are expected to handle.

While 1983 saw all 273 C-141 aircraft complete the year intact, it didn't look that way in the beginning. During an instructor upgrade ride, one C-141B stopped on the runway with no gear underneath. It was during the fifth approach for a touch-and-go landing by the right seat pilot that the aircraft landed gear up. The crew evacuated the aircraft uneventfully. It cost $459,000 to repair the damage.

Later, another C-141B landed on only two of its three gear. Like previous mishaps in 1979 and 1981, a main landing gear cylinder separated. The left main landing gear bogie fell to the ground and destroyed itself. The crew conducted a "conference skyhook." After that, the aircraft landed on the right main and nose landing gear with only the upper cylinder of the left main landing gear supporting the aircraft. The crew egressed safely.

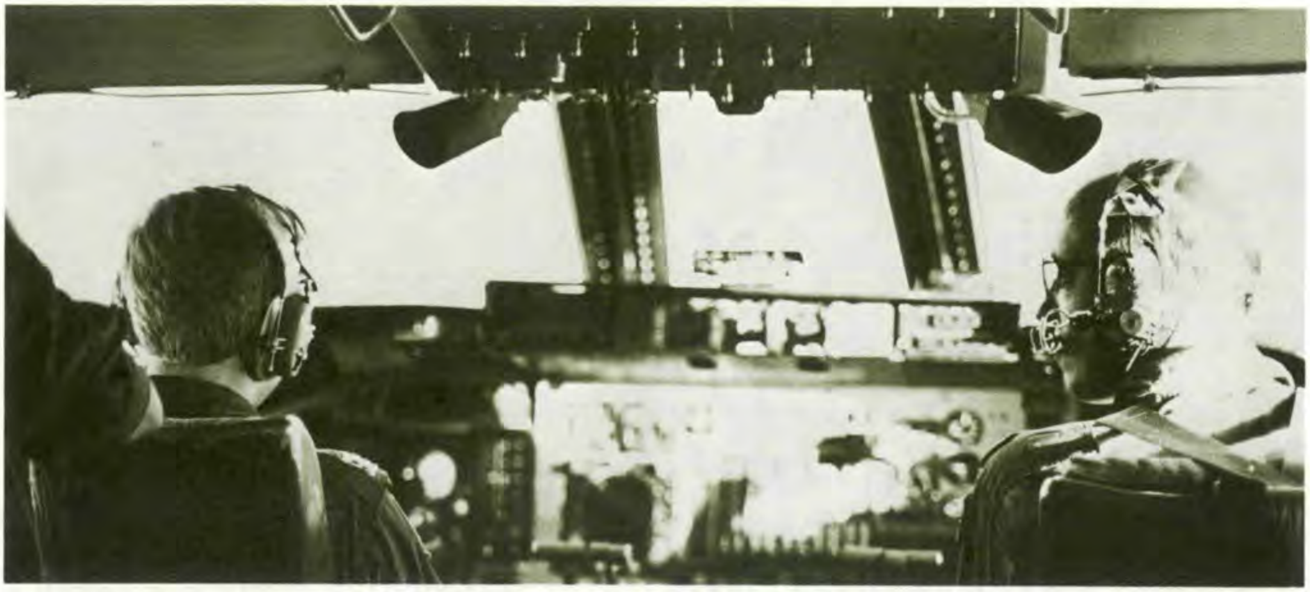
The remainder of the year saw no major mishaps occur despite the heavy exercise and contingency requirements levied. Thus the Class A rate of 0.39 mishaps per 100,000 flying hours remains unparalleled (C-5 = 1.9; C-130 = 1.24). The Class B rate also remained low at 0.29. The increase from 140 Class C/HAP mishaps in 1982 to 150 last year included 77 Class C and 73 high accident potential mishaps (see Figure 2 for breakdown).

Logistics Mishaps

The term logistics refers to the mishaps that have to do with the design, procurement, maintenance, handling, or modification of the aircraft. MAC matched the Air Force with a decreasing trend in logistics mishaps. Flight control related mishaps decreased while landing gear related mishaps increased. Engine and thrust reverser mishaps were insignificant while Number 2 hatch problems increased.

Previous areas of concern — the rudder power control unit (PCU),

In 1983, its 20th year of service, the C-141 experienced no Class A mishaps. This is especially noteworthy considering the diversity of its missions which included strat airlift, airevac, or airdrop in Lebanon, Grenada, Diego Garcia and Chad.



C-141 continued

FIGURE 1
C-141 FLIGHT MISHAPS (1979-83)

Class	'79	'80	'81	'82	'83
A	3	1	1	1	0
B	4	0	1	0	2
C	90	109	73	66	77
HAP	103	123	66	74	73
Total	200	233	141	141	152

FIGURE 2
1981 VS 1982 MISHAP COMPARISON

	1981	1982	1983
LOGISTICS	76	60	53
Flight Controls	37	18	13
Landing Gear	24	10	18
Hatch			3
Misc (No Trend)	11	22	19
OPERATIONS	15	13	23
Taxi Mishaps	5	0	3
Air Refueling	4	2	3
Belly Scrape	3	2	8
Misc (No Trend)	3	9	7
OTHER	50	68	76
Cargo Spills	19	29	31
Birdstrikes	15	20	25
Engine FOD	7	8	10
Physiological	7	6	2
Misc (No Trend)	2	5	8

the aileron PCU and the aileron support structure have all shown improvement. The rudder PCU swapout is complete so rudder problems have decreased sharply. The aileron PCU change out is being speeded up to eradicate aileron problems. The aileron wing structure has been beefed up fleet-wide with no problems noted. Elevator malfunctions have held constant and analysis is being done to see if there is any common reason for these mishaps.

The number of landing gear mishaps has increased this year and certain tire related problems are appearing. Most others showed no common theme. Tire failures in 1983 were primarily due to FOD or underinflation. Tire inflation is critical and needs very close scrutiny by all parties. A slight case of underinflation can cause the tires to vibrate and wobble and thus fail earlier than expected. Tire failures due to FOD also require us to be vigilant at every location we transit.

The Number 2 emergency escape hatch did require action during the year. Rigging of this hatch requires close tolerances to ensure it stays in place. As a result of 1983's mishaps, new rigging procedures and methods have been instituted to improve the system.

Other logistics mishaps that deserve your attention were the aircraft that had four generators fail in Africa and a dual transformer rectifier (TR) failure at Hanscom. The reason for the generator malfunction was never discovered despite a great deal of assistance and careful analysis of the system. Similarly, despite the in-depth investigation of the three losses of DC electrical power which caused the two TRs to fail, no cause could be found that would explain the dual TR failure.

Operations-Related Mishaps

Operations/crew mishaps saw a large increase in 1983 — up from 15 in 1981 and 13 in 1982 to 23 in 1983. Many of these mishaps are considered noteworthy starting with the gear-up landing. Tail scrapes were the big factor in causing the operations-related mishap number to rise. Aerial refueling and taxi mishaps also increased. Some of the other operations-related mishaps of note were: a crew scraped an engine and wing in heavy crosswinds in Japan; tires blew on rejected take off for a suspected birdstrike; hot brakes on landing caused the tires to deflate; a thrust reverser opened in flight because of open circuit breakers; loading struts were left behind at one location; and there were several other wind related problems during landing that caused mishaps. Tail/belly scrapes on landings appear to be an insidious problem. Crews don't always know when they scrape the aircraft and then the problem/damage is not necessarily detected until much later. This late discovery makes it difficult to determine the cause. Crew training on

C-141 operations-related mishaps are increasing! If the C-141 is to maintain its safety record (one of the best in cargo aircraft history), we have to turn this trend around.

proper landing procedures and techniques on spoiler deployment as well as better detection methods will hopefully reduce the number and hazard of these occurrences.

The increase in operations-related mishaps has caused a great deal of concern at all levels of command. Operations mishaps usually have the worst results — destroyed aircraft with fatalities. On the other hand, the results of the Grenada operation are indicative of the success and high degree of safety we can demonstrate when we have to "deliver the goods." This high level of professionalism must be carried over throughout the year if we are to reverse this adverse trend of operations mishaps. From the end of 1983 through the beginning of 1984 there has been a reversal in this trend. Keep up the good work.

Other Mishaps

This category covers mishaps not attributable to either operations or logistics factors. Most of these mishaps are beyond the control of aircrews or maintenance. It increased again last year from 68 in 1982 to 76 in 1983. Birdstrikes, several FOD engines, and cargo leaks all combined to raise the number of these other mishaps. Cargo leaks are a special area of concern and the aircrews can be the saving grace. Improper cargo preparation and lack of supervision when authorizing hazardous cargo for air shipment are the root causes of almost all cargo spills. The aircrews, especially the load masters, are the final check before this bad cargo gets loaded and becomes airborne. Time is short, and the load needs to get on the aircraft so that "we can move the mission." This leaves little time at this point for the aircrews to check the cargo and make sure it is prepared properly. But spending this extra time will go a long way in preventing some of these mishaps.

The forecast for '84 is one Class A and one Class B mishap, both ops-related. Let's not let them happen!

C-141 Safety Record

Although the missions get longer and more diverse, C-141's have maintained one of the best mishap rates in cargo aircraft history. This is due to the hard work and professional attitude the aircrews and maintenance personnel have displayed over the years to accomplish the mission safely.

In 1984, the official AFISC forecast calls for 1 Class A mishap and 1 Class B mishap. The Class A involves collision with the ground in which the aircraft is destroyed and the Class B is for a landing gear-related mishap. The previously mentioned trend in operations-related mishaps is cause for concern. All of MAC's 1983 Class A mishaps and an increasing number of Class B and C mishaps fall into the operations category. Several of the Class C mishaps that occurred in 1983 could have been Class A but for the excellent efforts of the aircrews.

The C-141's safety record remains impressive. The challenge is to keep it that way. ■

HELICOPTERS

MAJOR ANTHONY J. ROGET
Directorate of Aerospace Safety

■ A record was set for USAF helicopters in 1983. For the first time in history, there were no Class A helicopter mishaps. This is a remarkable accomplishment considering the increasingly demanding missions we're flying and the age of some of our aircraft.

This fine record was marred somewhat by two H-53 Class B mishaps. Figure 1 shows the 1983 mishap experience by category.

The first Class B mishap involved two HH-53Cs. The mishap aircraft was Number 2 in a two-ship formation that had landed following a training mission. As Number two taxied into a parking spot, its main rotor blades struck the stationary main rotor blade of the lead aircraft. Both helicopters were damaged, as was a KC-135 parked nearby. Fortunately, no one was injured.

The second Class B occurred during a test program. During landing, the main rotor blades struck the fuselage, damaging the EAPS, the cabin top, and the refueling probe. Once again, there were no injuries.

There were a total of 104 Class C and high accident potential (HAP) mishaps reported. Figure 2 breaks these down by system. Most involved some sort of materiel failure.

CLASS OF MISHAP

	A	B	C	HAP
H-1	0	0	24	13
H-3	0	0	25	8
H-53	0	2	14	17
H-60	0	0	1	2
	0	2	67	38

FIGURE 1

CLASS C & HAP MISHAPS

	H-1	H-3	H-53	H-60
Aircrew	4	4	0	0
Engine	11	14	5	1
Drive System	7	6	0	1
Flt Controls	1	1	2	0
FOD	4	2	3	0
Rotor Blade	0	1	9	0
Other	10	5	12	1
	37	33	31	3

FIGURE 2

H-1

The Huey fleet had the largest share of Class C's and HAPs with 37. The largest single problem area was engines, although no common factor was evident. Two N-models had tail fins cracked. Warner Robins is working to correct this problem. Four aircrew mishaps were reported, including two tree strikes.

H-3

The major problem here also was with the engine, with in-flight flameouts leading the list. A couple of these would have resulted in a Class A if circumstances had been slightly different. Drive system malfunctions, usually resulting in vibration, were the next most reported problem. Aircrew errors accounted for four mishaps and included one tree strike and one wire strike.

H-53

The H-53 fleet reported 31 mishaps. There were a total of eight main rotor blade pockets lost. In late 1983, special reporting was established for blade pockets to get a better understanding of the scope of the problem. Positive steps to fix the problem have been taken. Engines were second on the list with five mishaps. All involved in-flight shutdowns.

H-60

The H-60s had three reported mishaps in 1983. One was an engine shutdown in flight, one a problem with the gunner's belt, and one a problem with the main gear box.

All in all, 1983 was an extremely good year. Hard work on the part of operators, maintainers, and supervisors was greatly responsible, plus a probable dose of good luck. However, if we hope to continue the '83 record into 1984, greater efforts are required by all. We cannot rest on our laurels. For as soon as we're satisfied with our record, we relax and that's when the AWTH (accident waiting to happen) strikes. Will it strike you? ■

FATIGUE

THE CATALYST FOR TRAGEDY

MAJOR MICHAEL J. KAYE
Directorate of Aerospace Safety

■ I woke up at 0515 this morning tired! We had an 0700 brief for an 0900 launch. Yesterday, I was on duty for the usual 12 hours and got to bed about 2200. I didn't sleep well for some reason and didn't feel like a big breakfast, so I just grabbed a coke and doughnut.

Our flight leader was fired up about the mission and wanted to brief early. The aircraft wasn't ready on time so we took off 30 minutes late. Getting new times coordinated along the route and on the range really turned into a gaggle. The flight went OK, but I didn't do as well as I'd hoped. The debriefing lasted over an hour, and I really had to push to get my additional duties up to speed and get out of the squadron before violating crew rest for tomorrow's flight.

Have you been there? Undoubtedly if you've been an aircrew member for any length of time, there have been occasions when you felt like forgetting the whole thing and sleeping for a week. When this happens, your body and mind are giving you warnings that many of us choose to ignore. Fatigue or that burned-out feeling is the incipient danger signal that your functions as an aircrew member are primed for causing a mishap — with you right at the center of the problem.

Fatigue is reported as being either a suspected or definite contributing factor in approximately 10 percent of all USAF Class A mishaps. There are some who believe the true figure is actually much higher and that fatigue is underrecognized, underreported, and underadmitted. Unfortunately, fatigue often falls in the "we know it's out there but can't prove it" category. One thing for certain — given the right environment, it can be the catalyst for a tragedy.

In general, "fatigue" can be thought of as a debt — caused by work or insufficient rest, and paid off only by rest. Among other effects, it impairs mental/physical performance. There are two broad categories of fatigue: acute or short-term, and chronic or long-term. Acute fatigue is a short-lived common occurrence. Some causes of acute fatigue include: inadequate rest, mild hypoxia (oxygen deficiency), physical stress, (pulling Gs is very fatiguing), psychological stress (such as preparing for and flying a demanding mission), and circadian rhythm upsets that interfere with sleep (time zone change).

Chronic fatigue results from long workdays, chronic sleeping difficulties, or lack of exercise. A common source of chronic fatigue in the military is the long duty day/long work week: 12 plus hour days, 6 plus days per week, week after week. Mid-level supervision suffers most here. The flight lead, flight commander, assistant ops officer or ops officer all have a combination of extensive job responsibilities plus sufficient visibility requiring their presence. If they are unable to get the rest, relaxation and exercise they need, sooner or later they start to burn out. Additionally, the newcomer working overtime to become mission ready as soon as possible may also become a victim of this problem.

Fatigue is hazardous for a number of reasons. It produces carelessness, forgetfulness, sloppiness, slowed reactions, inappropriate reactions, irritability, disinterest, and the loss of timing involved in performing tasks. It erodes judgment and causes disorders of attention — dis-

continued

FATIGUE continued

tractions, channelized attention, and inattention. It can produce a subtle erosion of performance along with an inability to recognize it, plus an unwillingness to do anything constructive about it. In short, it's a bad actor — one which deserves our close consideration.

Countermeasures to avoid the effects of either acute or chronic fatigue include: proper diet, hydration, adequate rest and sleep, physical conditioning, and the common sense to stay on the ground until your alertness and energy are restored. These are worthy statements if you could choose when to fly, but what about the wishes of your Ops officer who happens to be your flight lead and OER rater? Tell him you are too tired to fly? Probably not. Ironically, the same human nature that gets pilots fatigued in the first place will work to prevent them from complaining about it to the appropriate people, especially if others in the unit appear to be working just as hard.

What can be done to reduce the number of fatigue related mishaps? It isn't likely the "system" will change — long duty days, lengthy exercises, and extended flights across multiple time zones will continue. The answer must rest with the individual and his or her ability to successfully cope with fatigue. Here are some suggestions to help you along the line.

▪ Recognize the problem. Some people occasionally experience acute fatigue while others suffer from the chronic variety where fatigue has become a way of life. In either case, the first step is to face the fact that a problem exists which adversely affects your performance.

▪ Have a plan. Fatigue is an individual and subjective phenomenon. Only the crewmember knows how tired he or she is. Like hypoxia, we all have our own symptoms for fatigue. We must know these indications and be willing to exert additional effort to overcome their effects. Thorough mission planning is more important than ever, and you must be extra cautious and alert during the more demanding portions of the mission. Be careful, however, to avoid the pitfall of letting your guard completely down after completing the perceived "tough part" of the flight. Also, watch out for channelized attention. It's a real problem when you're tired and you must make a mental effort not to stare at or dwell on any one thing for too long.

Prior to every mission each aircrew should include fatigue when assessing his own personal capability of performing that mission. There is a point beyond which you may not be safe. What you need is something upon which to base a personal go-no-go decision. Ask yourself what the worst problem or situation you could encounter on a mission might be and then decide if you could handle it. Yes, you go. No, you don't. It's tough, asking to be removed from the flying schedule, especially in a unit where the "can do" attitude predominates, but the consequences can be a lot tougher. Supervisors need to become actively involved by watching for fatigue in their aircrews and intervening constructively when necessary. By the way, that includes evaluating themselves. Remember that mid-level supervisors are the ones most likely victims of chronic fatigue. Playing "iron man" as a supervisor sends exactly the wrong signal to the troops.

Pilot fatigue is an important problem underlying many USAF mishaps. Its effects can be minimized, however, when we recognize the problem and learn to cope with it effectively. All of us need to be especially alert to the insidious effects of this subtle killer. ■

Countermeasures to avoid the effects of fatigue include proper diet, hydration, adequate rest and sleep, physical conditioning, and the common sense to stay on the ground until your alertness and energy are restored.

THERE I WAS

■ The mission required an assault landing on a 3,700 foot ''out in the middle of nowhere strip.'' Then we taxied the C-130 back to the approach end and pointed it down the runway. The MAC directives require engine shutdown for the hazardous cargo we unloaded. We shut 'em down and went through the engine shutdown checklist exactly as printed including parking brake — released. That was our mistake!

The plane was chocked, cargo unloaded, and the crew deplaned to observe the mountain top we had landed on.

The Army personnel tried to be helpful and put our unloading equipment back on the plane. I'm sure the private meant well when he pulled the chocks and threw them in back.

The runway had a 1.2 degree slope and if not for the location of two sharp crewmembers, that plane would have rolled off the mountain. I never knew a C-130 could move that fast with all engines shutdown!

The lesson learned is that when operating from remote sites with people unfamiliar with your aircraft, be prepared to handle unexpected contingencies. ■

IFC Approach

■ We, at the USAF Instrument Flight Center (IFC), want to know what type of instrument information you, as aircrews, need to fly your mission. Your answers to this survey will help us develop more effective IRC guidelines that ensure all vital information is presented at your local IRC. From these guidelines, MAJCOMs, wings, and units will be able to develop comprehensive and meaningful training programs that support the IRC goals.

The purpose of the IRC should be two-fold. First, to disseminate the latest and most pertinent instrument flight information. Second, and most important, to eliminate misunderstanding that could lead to aircraft mishaps. The USAF recently lost an aircraft and aircrew due, in part, to an apparent confusion as to the meaning of the words "radar contact." Those words should have told the crew only that position reports were no longer required; however, the pilot still retains the responsibility for navigation and, most importantly, terrain clearance. We believe this mishap and others involving procedural confusion and/or deviations are preventable through training. The IRC is the training vehicle that can best present this type of material to aircrews. The key is to build quality IRC training and that is where you in the operational units can help.

Please help us to help you by filling out the questionnaire completely, including any additional comments, and dropping it in your mail box. Send to: USAF IFC/FD (Capt Bennett), Randolph AFB TX 78150. ■

see form on next page

IFC SURVEY

1. NAME (Optional) ________________
2. MAJCOM/Unit ________________
3. Aircraft Type ________________

4. Which of the following items should be: required in IRC; optional in IRC; deleted from IRC? (Check the appropriate box)

A. PROCEDURES	Req'd	Opt	Delete
(1) AFR 60-16 Review	☐	☐	☐
(2) AFM 51-37	☐	☐	☐
(3) AFR 60-1 Review	☐	☐	☐
(4) DD Form 175/1801	☐	☐	☐
(5) AF Form 70/Command Sub	☐	☐	☐
(6) FLIP Pubs Review	☐	☐	☐
(7) NOTAMS	☐	☐	☐
(8) SIDS/DEP Procedures	☐	☐	☐
(9) Position Reports	☐	☐	☐
(10) Lost Comm	☐	☐	☐
(11) IFR Lost Wingman	☐	☐	☐
(12) Refiling Inflight	☐	☐	☐
(13) Holding	☐	☐	☐
(14) Radar Vectors	☐	☐	☐
(15) ASR Approaches	☐	☐	☐
(16) ILS Approaches	☐	☐	☐
(17) PAR Approaches	☐	☐	☐
(18) TACAN Approaches	☐	☐	☐
(19) VOR Approaches	☐	☐	☐
(20) NDB Approaches	☐	☐	☐
(21) ICAO Course Reversals	☐	☐	☐
(22) Low Altitude Procedures	☐	☐	☐
(23) Circling Approaches	☐	☐	☐
(24) Missed Approach	☐	☐	☐
(25) Climbout Procedures	☐	☐	☐
(26) HUD Instrument Procedures	☐	☐	☐

B. TECHNIQUES	Req'd	Opt	Delete
(1) Fix-to-Fix	☐	☐	☐
(2) Diversion	☐	☐	☐
(3) Emergencies	☐	☐	☐
(4) Enroute Descent	☐	☐	☐
(5) Penetrations	☐	☐	☐
(6) Descent Gradients	☐	☐	☐
(7) Transition to Landing	☐	☐	☐
(8) Airport Lighting Sys.	☐	☐	☐

C. MISCELLANEOUS	Req'd	Opt	Delete
(1) Local Climatology	☐	☐	☐
(2) Weather Charts	☐	☐	☐
(3) DD Form 175-1	☐	☐	☐
(4) Weather Hazards	☐	☐	☐
(5) Wake Turbulence	☐	☐	☐
(6) Wind Shear	☐	☐	☐
(7) ASLAR*	☐	☐	☐
(8) Local Airspace	☐	☐	☐
(9) Local Traffic Flow	☐	☐	☐
(10) Spatial Disorientation	☐	☐	☐
(11) Local Checkride Trends	☐	☐	☐

5. How would you rate the IRC program that you attend?
   Excellent ☐ Good ☐ Average ☐ Poor ☐
   Why? ________________ **

6. How could the IRC program that you attend be improved most? ________________ **

7. How would you rate the training aids used at your IRC? (e.g., films, slides, video tapes, mock ups)
   Excellent ☐ Good ☐ Average ☐ Poor ☐
   Why? ________________ **

8. Are there any items not listed above that need to be added, deleted or changed in IRC? If so, please list them here.
   ________________ **

9. Other comments ________________ **

*Aircraft Surge Launch and Recovery

**Use additional sheet if necessary

PLEASE PHOTOCOPY THIS FORM. DO NOT CUT FROM MAGAZINE as others may want to use it also. Fill out form completely, fold, staple, and address to: USAF IFC/FD (Capt Bennett), Randolph AFB, TX 78150.

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UNITED STATES AIR FORCE

Well Done Award

Presented for outstanding airmanship and professional performance during a hazardous situation and for a significant contribution to the United States Air Force Accident Prevention Program.

MAJOR

JAMES P. CZEKANSKI

459th Tactical Airlift Wing (AFRES)
Andrews Air Force Base, Washington, D.C.

■ On 5 May 1983, Major Czekanski was instructing assault landings from the right seat of a C-130B aircraft on a tactical proficiency training sortie. Several assault landings had been made to the landing zone (LZ) without incident. Then on the last landing, the nose landing gear suddenly collapsed shortly after landing in the normal touchdown portion of the LZ. Directional control problems were encountered and the aircraft began to veer off to the right side of the narrow assault strip. Major Czekanski quickly took over aircraft control and, with a skillful combination of differential power and flight control inputs, was able to return the aircraft to near centerline of the LZ while braking to a stop within the limited 3,600 foot total runway length. The crew executed emergency egress procedures and escaped without injuries. Major Czekanski's superior skill and proficiency during an intensely critical phase of flight averted disaster and limited aircraft damage to the absolute minimum. WELL DONE! ■


IT'S NOT A TOY...
BE PREPARED TO FLY!